

CLAIMS

1. A separator for fuel cell which is arranged in alternate lamination with a power generation cell and has gas discharge ports, for discharging reactive gas, on a layer surface thereof,

wherein the multiple gas discharge ports are provided on approximately whole area of the layer surface and the reactive gas is made to be discharged like a shower from the gas discharge ports toward the power generation cell.

2. The separator for fuel cell according to claim 1, comprising a hollow part for receiving the reactive gas, wherein the reactive gas is made to be guided to each of the gas discharge ports via the hollow part.

3. The separator for fuel cell according to claim 2, comprising a gas inlet for introducing the reactive gas into the hollow part, wherein the gas discharge ports are arranged along multiple virtual lines radially extended from the position of the gas inlet, respectively.

4. The separator for fuel cell according to claim 2, comprising a gas inlet for introducing the reactive gas into the hollow part, wherein the gas discharge ports are arranged along multiple virtual concentric circles centered at the gas inlet, respectively.

5. The separator for fuel cell according to claim 2, wherein the gas discharge ports are arranged along multiple virtual lines radially extended from the center part of the layer surface, respectively.

6. The separator for fuel cell according to claim 2, wherein the gas discharge ports are arranged along multiple virtual concentric circles having a center in the center part of the layer surface, respectively.

7. The separator for fuel cell according to claim 1, comprising an inner flow passage for guiding the reactive gas, wherein the gas discharge ports are provided along the inner flow passage.

8. The separator for fuel cell according to claim 7, wherein the hole diameter of the gas discharge ports is set to become large from the upstream side toward the downstream side of the inner flow passage.

9. The separator for fuel cell according to claim 7, wherein the inner flow passage is a spiral flow passage having a starting point in the outer peripheral part of the separator.

10. The separator for fuel cell according to claim 7, wherein the inner flow passage is formed in a zigzag state from one end toward the other end in the radial direction of the layer surface.

11. The separator for fuel cell according to claim 7, wherein the inner flow passage is formed by multiple flow passages radially branched from a gas inlet in the outer peripheral part.

12. The separator for fuel cell according to claim 2, wherein the wall surface of the hollow part is subjected to an aluminum diffusion coating treatment for making aluminum diffused and penetrated.

13. The separator for fuel cell according to claim 7, wherein the wall surface of the inner flow passage is subjected to an aluminum diffusion coating treatment for making aluminum diffused and penetrated.

14. The separator for fuel cell according to claim 1, comprising a structure formed by laminating multiple plate-shaped members including a plate-shaped member provided with a groove hole, in which the plate-shaped members are laminated to cover the opening of the groove hole and thereby an inner flow passage or a hollow part for guiding the reactive gas is formed, and

in which an iron based alloy, a nickel based alloy or a chromium based alloy is used as a base material of the plate-shaped member, and one or both surfaces of the base material are plated with silver, a silver alloy, copper or a copper alloy.

15. The separator for fuel cell according to claim 14, wherein the wall surface of the inner flow passage or the hollow part is subjected to an aluminum diffusion coating treatment for making aluminum dispersed and penetrated through the surface of the base material, instead of the plating treatment using silver, a silver alloy, copper or a copper alloy.

16. A solid oxide fuel cell, which has a fuel cell stack formed by alternately laminating power generation cells and separators and which supplies reactive gas to each of the power generation cells to generate power generation reaction,

wherein the separator comprises the multiple gas discharge ports which are provided on approximately whole area of a layer surface thereof, and is constituted to discharge the reactive gas like a shower from the gas discharge ports toward the power generation cell.

17. A separator for fuel cell which is formed by laminating multiple plate-shaped members including a plate-shaped member provided with a groove hole, in which the opening of the groove hole is made to be covered by laminating the plate-shaped members and thereby an inner flow passage for guiding the reactive gas is formed,

wherein an iron based alloy, a nickel based alloy or a chromium based alloy is used as a base material of the plate-shaped member, and both surfaces of the base material

are plated with silver, a silver alloy, copper or a copper alloy.

18. A separator for fuel cell which is formed by laminating multiple plate-shaped members including a plate-shaped member provided with a groove hole, in which the opening of the groove hole is made to be covered by laminating the plate-shaped members and thereby an inner flow passage for guiding the reactive gas is formed,

wherein an iron based alloy, a nickel based alloy or a chromium based alloy is used as a base material of the plate-shaped member, and each one of the surfaces of the multiple plate-shaped members which are brought into contact with each other at the time of lamination, is plated with silver, a silver alloy, copper or a copper alloy.

19. A method for producing a separator for fuel cell which is formed by laminating multiple plate-shaped members including a plate-shaped members provided with a groove hole, in which the opening of the groove hole is made to be covered by laminating the plate-shaped members and thereby an inner flow passage for guiding the reactive gas is formed, the method comprising:

plating one or both surfaces of an iron based alloy, a nickel based alloy or a chromium based alloy used as a base material of the plate-shaped members, with silver, a silver alloy, copper, or a copper alloy; forming the plate-shaped members by pressing the base material, respectively;

thereafter, laminating the plate-shaped members formed by the pressing operation; and mutually joining and integrating the plate-shaped members by softening or melting the plated material on the layer surface of the plate-shaped members.

20. The separator for fuel cell according to claim 17, wherein the wall surface of the inner flow passage is subjected to an aluminum diffusion coating treatment for making aluminum diffused and penetrated through the surface of the base material made of an iron based alloy, a nickel based alloy or a chromium based alloy, instead of the plating treatment using silver, a silver alloy, copper or a copper alloy.

21. A solid oxide fuel cell, which has a fuel cell stack formed by alternately laminating power generation cells and separators and which supplies reactive gas to each of the power generation cells to generate power generation reaction,

wherein the separator is formed by laminating multiple plate-shaped members including a plate-shaped member provided with a groove hole, and is constituted to make the opening of the groove hole covered by laminating the plate-shaped members and to thereby make an inner flow passage for guiding the reactive gas formed, and

wherein an iron based alloy, a nickel based alloy or a chromium based alloy is used as a base material of the plate-shaped member, and one or both surfaces of the base material is plated with silver, a silver alloy, copper or a copper alloy.

22. The solid oxide fuel cell according to claim 21, wherein the separator is constituted to comprise multiple gas discharge ports provided on approximately whole area of a layer surface facing the power generation cell and to make the reactive gas discharged like a shower from the gas discharge ports toward the power generation cell.